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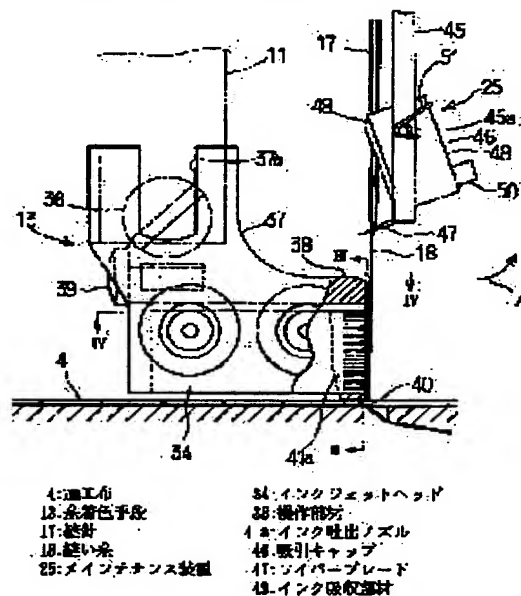
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(54) THREAD COLORING SEWING MACHINE AND MAINTENANCE DEVICE

(57)Abstract:

PROBLEM TO BE SOLVED: To easily execute a maintenance process of an ink jet head in a thread coloring means coloring a sewing thread by an ink jet method.

SOLUTION: This thread coloring sewing machine is provided with the thread coloring means 13 coloring the sewing thread 19 with the ink discharged from the ink jet head 34. When a presser bar 11 is vertically moved, the maintenance process of the ink jet head 34 is executed.



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CLAIMS

[Claim(s)]

[Claim 1] The blind stitch means forming which forms the blind stitch by sewing thread in said processing cloth by moving a sewing needle up and down to a processing cloth, In the yarn coloring sewing machine which comes to have a yarn coloring means by which the ink made to breathe out from an ink jet head colors said sewing thread The yarn coloring sewing machine characterized by equipping the maintenance equipment which performs maintenance processing of said ink jet head, and said maintenance equipment with the operating member for performing maintenance processing of said ink jet head.

[Claim 2] It is the yarn coloring sewing machine according to claim 1 characterized by equipping the pressure bar of a sewing machine with said yarn coloring means free [attachment and detachment], interlocking with [vertical movement / of said pressure bar] said operating member, and being constituted so that maintenance processing by said maintenance equipment may be performed.

[Claim 3] Said operating member is a yarn coloring sewing machine according to claim 2 characterized by for vertical movement of said pressure bar being interlocked with, and being constituted so that maintenance processing by said maintenance equipment may be performed by moving said ink jet head in the direction containing a horizontal direction or a horizontal component.

[Claim 4] Said operating member is a yarn coloring sewing machine according to claim 2 characterized by being constituted so that maintenance processing by said maintenance equipment may be performed by vertical movement of said pressure bar being interlocked with, and rotating said maintenance equipment.

[Claim 5] It is the yarn coloring sewing machine according to claim 1 to 4 characterized by to have had the ink regurgitation nozzle of a large number which it is prepared in said ink jet head, and carry out opening to the ink regurgitation side of said ink jet head, and to equip said maintenance equipment with the wiper function which wipes off the ink regurgitation side of said ink-jet head, the capping function which blocks opening of said ink regurgitation nozzle, and the purge function perform the air-bleeder of said ink regurgitation nozzle.

[Claim 6] The blind stitch means forming which forms the blind stitch by sewing thread in said processing cloth by moving a sewing needle up and down to a processing cloth, The pressure bar which it has for the cloth presser foot which is constituted possible [vertical movement] and prevents the relief of said processing cloth in contact with the top face of said processing cloth, enabling free attachment and detachment, In the yarn coloring sewing machine which comes to have a yarn coloring means by which the ink made to breathe out from an ink jet head colors said sewing thread It is the yarn coloring sewing machine which is equipped with the maintenance equipment which performs maintenance processing of said ink jet head, and is characterized by performing maintenance processing of said ink jet head by said maintenance equipment with lifting of said pressure bar.

[Claim 7] The blind stitch means forming which forms the blind stitch by sewing thread in said processing cloth by moving a sewing needle up and down to a processing cloth, The body of a sewing machine of the yarn coloring sewing machine which comes to have a yarn coloring means by which the

ink made to breathe out from an ink jet head colors said sewing thread is equipped free [attachment and detachment]. In maintenance equipment equipped with the maintenance device in which maintenance processing of said ink jet head is performed, the maintenance processing by said maintenance device Maintenance equipment characterized by being constituted so that it may perform by operating the operating member prepared in said body of a sewing machine.

[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the maintenance equipment for the yarn coloring sewing machine equipped with the function in which the ink breathed out from the ink jet head colors sewing thread, and this yarn coloring sewing machine being equipped removable, and performing maintenance processing of said ink jet head.

[0002]

[Description of the Prior Art] There is a sewing machine conventionally equipped with the function to color sewing thread (needle thread). Moreover, these people have also applied for invention indicated by JP,59-137096,A. It constitutes from this invention so that liquefied coloring liquid (ink is only called hereafter), such as dyeing material, may be sprayed on sewing thread with an ink jet method and it may color.

[0003]

[Problem(s) to be Solved by the Invention] However, there were the following problems by the sewing machine equipped with the device in which an ink jet method colors sewing thread, like the configuration of application which is not exhibited [above-mentioned]. That is, since ink is not breathed out even if it will apply a pressure, if air bubbles and a foreign matter enter in the stoma of the **** nozzle of an ink jet head, the maintenance processing called the so-called "purge" which removes air bubbles periodically is required. Moreover, if left in the condition [that ink has adhered to the front face of a **** nozzle], ink will dry, or ink will be got blocked in the stoma of a **** nozzle, and ink will no longer be too breathed out from a **** nozzle. For this reason, the maintenance processing called "wipe" which wipes off the ink adhering to a **** nozzle, and the maintenance processing called "capping" which closes the stoma group of a **** nozzle at the time of un-using it are required.

[0004] Therefore, in the electronic sewing machine equipped with the device in which the above-mentioned ink jet method colors yarn, in case the device for performing maintenance processing is prepared in a coloring device with an ink jet head or installation and maintenance processing are performed for a coloring device removable to the body of a sewing machine, the configuration which removes a coloring device from the body of a sewing machine is adopted.

[0005] Although the activity for maintenance processing can be easily finished if the device in which said maintenance processing is performed is prepared in a coloring device, it large-sized-izes that much. For this reason, said coloring device is installed in the sewing-machine upper part which has allowances in a tooth space. However, when a coloring device was prepared in the sewing-machine upper part, in order that a coloring part and a blind stitch formation part might separate, it was difficult to carry out a color substitute in a desired location, and there was a problem which coloring liquid adheres to each part of a sewing machine, and becomes dirty and to say.

[0006] On the other hand, in a configuration of attaching a coloring device removable to the body of a sewing machine, it becomes possible [sewing a coloring device and preparing near the needle]. However, in this case, whenever it performs maintenance processing, it is necessary to remove a

coloring device from the body of a sewing machine, and there is a problem that that part and an activity become troublesome.

[0007] Then, the object of this invention is to offer the yarn coloring sewing machine and maintenance equipment which can perform maintenance processing of an ink jet head easily in the thing equipped with a yarn coloring means to color sewing thread, by the ink jet method.

[0008]

[Means for Solving the Problem] The blind stitch means forming which forms the blind stitch by sewing thread in said processing cloth when invention of claim 1 of this application moves a sewing needle up and down to a processing cloth, The maintenance equipment which is the yarn coloring sewing machine which comes to have a yarn coloring means by which the ink made to breathe out from an ink jet head colors said sewing thread, and performs maintenance processing of said ink jet head, It has the description at the place which equipped said maintenance equipment with the operating member for performing maintenance processing of said ink jet head.

[0009] According to the above-mentioned configuration, maintenance processing by said maintenance equipment can be performed only by operating an operating member.

[0010] And in the above-mentioned configuration, it is desirable to equip the pressure bar of a sewing machine with said yarn coloring means free [attachment and detachment], and for said operating member to be interlocked with vertical movement of said pressure bar, and to constitute so that maintenance processing by said maintenance equipment may be performed (invention of claim 2).

[0011] Since according to the above-mentioned configuration you can make it actuation of the vertical movement of a pressure bar usually performed at the time of activation of blind stitch formation actuation or termination interlocked with and maintenance processing can be performed, it is not necessary to carry out troublesome actuation, in order to perform maintenance processing, and to prepare the special member for it.

[0012] In this case, it is desirable for said operating member to be interlocked with vertical movement of said pressure bar, and to constitute so that maintenance processing by said maintenance equipment may be performed by moving said ink jet head in the direction containing a horizontal direction or a horizontal component (invention of claim 3).

[0013] Moreover, by interlocking with [vertical movement / of said pressure bar] said operating member, and rotating said maintenance equipment, it can also constitute so that maintenance processing by said maintenance equipment may be performed (invention of claim 4).

[0014] Furthermore, in the configuration equipped with the ink regurgitation nozzle of a large number which it is prepared in said ink jet head, and carry out opening to the ink regurgitation side of said ink jet head again, it is good to prepare the wiper function which wipes off the ink regurgitation side of said ink jet head to said maintenance equipment, the capping function which blocks opening of said ink regurgitation nozzle, and the purge function perform the air-bleeder of said ink regurgitation nozzle (invention of claim 5).

[0015] According to the above-mentioned configuration, maintenance equipment can be made to perform two or more maintenance processings by operating an operating member.

[0016] Moreover, the blind stitch means forming which forms the blind stitch by sewing thread in said processing cloth when invention of this application claim 6 moves a sewing needle up and down to a processing cloth, The pressure bar which it has for the cloth presser foot which is constituted possible [vertical movement] and prevents the relief of said processing cloth in contact with the top face of said processing cloth, enabling free attachment and detachment, It is the yarn coloring sewing machine which comes to have a yarn coloring means by which the ink made to breathe out from an ink jet head colors said sewing thread. It has maintenance equipment which performs maintenance processing of said ink jet head, and maintenance processing of said ink jet head by said maintenance equipment is characterized by performing with lifting of said pressure bar.

[0017] According to the above-mentioned configuration, since a yarn coloring means and maintenance equipment were constituted on another object, a yarn coloring means does not large-sized-ize. And since maintenance processing by said maintenance equipment is performed in connection with a pressure bar

going up, the activity for maintenance processing does not become troublesome by having constituted a yarn coloring means and maintenance equipment on another object.

[0018] Furthermore, the blind stitch means forming which forms the blind stitch by sewing thread in said processing cloth when invention of this application claim 7 moves a sewing needle up and down to a processing cloth, The body of a sewing machine of the yarn coloring sewing machine which comes to have a yarn coloring means by which the ink made to breathe out from an ink jet head colors said sewing thread is equipped free [attachment and detachment]. Are maintenance equipment equipped with the maintenance device in which maintenance processing of said ink jet head is performed, and the maintenance processing by said maintenance device It has the description at the place constituted so that it might perform by operating the operating member prepared in said body of a sewing machine.

[0019]

[Embodiment of the Invention] Hereafter, the 1st example which was adapted for the embroidery sewing machine in this invention is explained, referring to drawing 1 thru/or drawing 10 . in addition, the configuration the fundamental configuration of the embroidery sewing machine of this example is indicated to be by the application for patent 2000-230400 for which these people applied previously and abbreviation -- it is the same. Then, the same part as the configuration of the above-mentioned application for patent 2000-230400 is explained briefly, and a different part is explained in detail.

[0020] First, the configuration of the embroidery sewing machine concerning this example is explained, referring to drawing 5 thru/or drawing 8 . As shown in these drawing 5 thru/or drawing 8 , the free arm section 2 is formed in the left end section of the bed section of the machine frame 1 of an embroidery sewing machine, and this free arm section 2 is equipped with embroidery equipment 3 removable.

[0021] The above-mentioned embroidery equipment 3 is equipped with the embroidery frame 5 holding cloth (processing cloth) 4 (refer to drawing 1), and the embroidery frame migration device in which this embroidery frame 5 is moved horizontally (X shaft orientations and Y shaft orientations), and is constituted. Said embroidery frame 5 consists of an outer frame and a seating rim, and has composition which puts cloth 4 among them.

[0022] Said embroidery frame migration device is equipped with the mobile 8 moved to X shaft orientations (longitudinal direction) free by the direction stepping motor 6 (shown only in drawing 10) of X, and is constituted. Said embroidery frame 5 is attached in Y shaft orientations (cross direction) movable at this mobile 8. Said mobile 8 is moved by the direction stepping motor 7 (shown only in drawing 10) of Y. The electrical installation embroidery equipment 3 and by the side of the body of an embroidery sewing machine is made by connection of the connector 9 by the side of said embroidery equipment 3 and the connector 10 prepared in the body side of an embroidery sewing machine.

[0023] Moreover, the pressure bar 11 is supported by the machine frame 1 possible [vertical movement]. The coloring section 13 of the coloring unit 12 is attached in the soffit of said pressure bar 11 removable. About this coloring unit 12 and the coloring section 13, it mentions later. In addition, the cloth presser foot which is not illustrated is usually attached in the soffit of said pressure bar 11. The above-mentioned pressure bar 11 is energized below by the pressure spring which is not illustrated.

[0024] Said pressure bar 11 is constituted so that it may move up and down according to a user's manual operation and the automatic pressure bar lifter device (not shown) by motorised. furthermore, the feed dog 14 which collaborates with a cloth presser foot and performs cloth delivery -- vertical movement and longitudinal slide movement -- it is prepared so that it may move horizontally. In the case of embroidery sewing, this feed dog 14 is constituted so that it may be caudad located rather than a throat plate 15.

[0025] Moreover, the needle bar 16 is formed in the vertical-movement possibility of and a longitudinal direction rockable and pivotable at the head section of a machine frame 1. About the concrete drive of this needle bar 16, it mentions later. The sewing needle 17 is attached in the soffit of the above-mentioned needle bar 16 through ***** 16a. If this sewing needle 17 moves up and down, it collaborates with the iron pot arranged under the throat plate 15, and it is constituted so that a seam may be formed in cloth 4 of the bobbin thread in an iron pot, and the needle thread 18 inserted in the sewing needle 17.

[0026] Furthermore, starting and the safety switch 19 which orders it starting or a halt of a sewing activity are formed in the head section of a machine frame 1. It is possible to equip the connector 22 for cards in which the slot for cards is prepared in the pedestal section 20 of a machine frame 1, and ROM card 21 which stored sewing data was formed in the pedestal section 20 through the above-mentioned slot. In the case of the embroidery sewing machine of the above-mentioned configuration, by making XY migration of an embroidery frame 5 and vertical movement of a needle bar 16 collaborate according to the sewing data in ROM card 21, it is constituted so that various embroidery patterns may be formed in cloth 4.

[0027] Furthermore, the control panel 23 is arranged in the front face of the machine frame 1 of a sewing machine again. A liquid crystal display (LCD) and various actuation switches are formed in this control panel 23.

[0028] Next, the concrete configuration of the above-mentioned coloring unit 12 is explained with reference to drawing 1 thru/or drawing 6. The coloring unit 12 consists of the coloring section 13 attached in the soffit of a pressure bar 11, an ink supply recovery system 24, and maintenance equipment 25. In this example, a coloring means consists of said coloring section 13 and an ink supply recovery system 24.

[0029] The above-mentioned ink supply recovery system 24 consists of a slot 27 for ink which sets the ink cassette 26, and an air compressor 30 which passes Ayr in the recovery tube 28 and collects surplus ink on the recovery tank 29. The above-mentioned ink cassette 26 consists of black, MAZENDA, yellow, and an ink cassette of four colors of cyanogen.

[0030] The power source of the above-mentioned air compressor 30 is connected to the connector 33 prepared in the body side of a sewing machine through the interconnection cable 31 and the connector 32. Moreover, wiring with which the electrical installation by the side of the ink jet head 34 mentioned later and the body of a sewing machine was also wired along with the ink supply tube 35 or the recovery tube 28, and the above-mentioned interconnection-cable 30 grade are realized.

[0031] Moreover, said coloring section 13 is fastened to the soffit of a pressure bar 11, and is attached removable with the screw thread 36. The above-mentioned coloring section 13 consists of a mounting object 37 to a pressure bar 11, a body 38 made of synthetic resin, and an ink jet head 34 held exchangeable in this body 38, as shown in drawing 1 thru/or drawing 4. Mounting slot 37a of about D configurations which attaches the soffit of a pressure bar 11 is formed in the upper part of the above-mentioned mounting object 37, and flange 37b which has the crevice which fits in the upper part of a body 38 is formed in the soffit. The above-mentioned body 38 is ****ed on the mounting object 37, is bound tight by 39 and is being fixed.

[0032] And the ink jet head 34 is won over to the crevice formed in the above-mentioned body 38 from the underside side, and hold immobilization is made and carried out. Opening (not shown) is formed in the pars intermedia of the vertical direction of the front face of said body 38, and it is constituted so that opening of ink regurgitation nozzle 41a of a large number formed in the front end surface part of the ink jet head 34 at this opening may face. Therefore, in this example, the front face of said body 38 functions as an ink regurgitation side. Moreover, the cloth press surface section 40 equivalent to the usual cloth presser foot is formed in the underside section of the anterior part of a body 38.

[0033] Moreover, in the side face of right and left of a body 38, four ink carrier inlet ports 38a-38d are formed in each two side faces at a time. It is constituted so that the ink of four colors may be supplied to these ink carrier inlet ports 38a-38d through the ink supply tube 35, respectively from the ink cassette 26.

[0034] Now, the ink jet head 34 consists of electrostriction component blocks of a rectangular parallelepiped mostly, and this electrostriction component block consists of a piezo-electric element etc. The sheet 41 which consists of a plate made of synthetic resin is stuck on the front end surface part of the above-mentioned electrostriction component block, and it is formed in this sheet 41 so that much ink regurgitation nozzle 41a may be located in a line with one train in the vertical direction. And the ink rooms 42a-42d of the shape of a ctenidium which consists of many slits are formed in right-hand side from the center within an electrostriction component block. The ink distribution sheet 43 which consists

of a plate made of synthetic resin so that opening of the shape of this ctenidium may be blockaded is stuck on the side face by the side of these ink rooms [42a-42d] right opening.

[0035] The ink room 42a group, the stoma group (not shown) which opens ink carrier inlet-port 38a for free passage, and an ink room 42b group and the stoma group (not shown) which opens ink carrier inlet-port 38b for free passage are formed in this ink distribution sheet 43. Moreover, it is constituted by the free passage slots 44a and 44b formed in the front face and rear face of the above-mentioned electrostriction component block so that an ink room 42c group, 42d group, and the ink carrier inlet ports 38c and 38d may be open for free passage, respectively.

[0036] And the electrode (not shown) for expanding and contracting the ink rooms 42a-42d, and making an ink droplet breathe out from ink regurgitation nozzle 41a is prepared in the predetermined location in the front face of an electrostriction component block. Impression control of the electrical potential difference to these electrodes is constituted so that it may be made the actuation timing of a sewing machine at the time of ** and may perform with the control unit by the side of the body of a sewing machine.

[0037] In this configuration, as shown in drawing 1 , the ink of cyanogen is breathed out from the thing of that topmost part, the ink of MAZENDA is breathed out from the 2nd thing, the ink of yellow is breathed out from the 3rd thing, black ink is breathed out from the 4th thing, and ink regurgitation nozzle 41a on a par with one train of the ink jet head 34 is hereafter constituted so that the sequence of these four colors may be repeated.

[0038] And ink regurgitation nozzle 41a on a par with the one above-mentioned train is arranged so that it may separate slightly almost in parallel and may counter from the confounding point of the seam of cloth 4 to the sewing thread (needle thread) 19 which reaches the eye hole of a sewing needle 17. That is, it is constituted so that the array direction of ink regurgitation nozzle 41a may turn into a direction along the feed direction of a needle thread (sewing thread) 18. Thereby, the ink droplet breathed out from ink regurgitation nozzle 41a has the composition of hitting a needle thread 18.

[0039] Now, as shown in drawing 1 , said maintenance equipment 25 is equipped with the attraction cap 46 attached in the lower part of the bearing bar 45 attached in the head section removable rotatable focusing on shaft 45a, and the wiper blade 47 attached in the soffit section of said bearing bar 45, and is constituted. Said wiper blade 47 is for example, the product made of synthetic resin which has elasticity, and is prolonged toward the slanting lower part from the soffit section of said bearing bar 45.

[0040] Moreover, said attraction cap 46 consists of a rectangle box-like case 48 in which a rear face carries out opening, an ink absorption member 49 held in this case 48, and an ink discharge hole 50 prepared in the lower part of the anterior part of said case 48. If said recovery tube 28 is connected to said ink discharge hole 50, it has composition which can attract ink from the ink absorption member 43, and can be collected on the recovery tank 29 by the Ayr style of the air compressor 30 of the ink supply recovery system 24. In addition, the configuration of said attraction cap 46 is the almost same configuration as the thing equipped with the ink jet head usually arranged in the interior of ink jet printer equipment, for example. Furthermore, rotation energization is carried out in the direction of drawing 1 Nakaya mark A with the spring 51, and said attraction cap 46 is attached in the lower part of said bearing bar 45 in the condition of having inclined as usually shown in drawing 1 .

[0041] Next, the drive of a needle bar 16 is explained with reference to drawing 9 . First, as shown in drawing 9 (a), the needle bar 16 is connected with the balance crank 53 which fixed in the left end section of the main shaft 52 of an embroidery sewing machine through the needle bar connecting link 54 and the needle bar connecting bracket 55, and, thereby, has the composition that a needle bar 16 moves up and down according to a revolution of a main shaft 52.

[0042] The above-mentioned needle bar connecting bracket 55 consists of bifurcation member 55a and cylindrical member 55b supported by this bifurcation member 55a rotatable, as shown in drawing 9 (b). The needle bar 16 is inserted in the breakthrough formed in cylindrical member 55b pivotable. And the needle bar connecting bracket 55 of the set colors 56 and 56 which fixed to the needle bar 16 is pinched. By this configuration, the needle bar 16 has rockable composition to the needle bar connecting bracket 55 at pivotable and a longitudinal direction.

[0043] Moreover, the gear section 57 of a spur gear is formed in the upper bed section of a needle bar 16, and the medium gear 58 which gears with this gear section 57 is supported rotatable by the pin 60 set up by the needle-bar base 59. The above-mentioned medium gear 58 has long spur gear section 58a and helical gear section 58b in the vertical direction. Idle gear 61 have geared in above-mentioned helical gear section 58b. These idle gear 61 are supported rotatable by the pivot 62 which supports the needle-bar base 59 rockable. The pivot 62 is supported by the machine frame 1.

[0044] Furthermore, to the above-mentioned idle gear 61, the axial gear 64 of the stepping motor 63 for a needle-bar revolution fixed to the machine frame 1 has geared. If the stepping motor 63 for a needle-bar revolution rotates in this configuration, it is constituted so that revolution actuation of the needle bar 16 may be carried out through the axial gear 64, idle gear 61, the medium gear 58, and the gear section 57. Thus, if a needle bar 16 is rotated, since a needle thread 18 will twist and rotate according to it, when applying an ink droplet to a needle thread 18 and coloring from the ink jet head 34, an ink droplet can be uniformly applied to the perimeter side of a needle thread 18 at homogeneity. In addition, at this example, where the stepping motor 63 for a needle-bar revolution is driven or stopped, it is possible to make a longitudinal direction rock the needle-bar base 59 and a needle bar 16.

[0045] Next, the electric configuration of the embroidery sewing machine of the above-mentioned example is explained with reference to drawing 10. The control unit 65 which controls the whole operation of this embroidery sewing machine is CPU66, ROM67, RAM68, the input interface 69, and an output interface. It consists of the 70th grades. The above-mentioned control device 65 is constituted so that the signal from the actuation switch group of starting and a safety switch 19, the timing signal generator 71 formed by approaching a main shaft 52, and a control panel 23 and coloring unit 12 grade may be inputted through the input interface 69.

[0046] And the control unit 65 is constituted so that actuation control of the ink jet head 34 and air compressor 30 grade of liquid crystal display 23a of the sewing-machine motor 72, the stepping motor 73 for a needle-bar splash, the stepping motor 74 for feed dog actuation, the stepping motor 63 for a needle-bar revolution, and a control panel 23, the direction stepping motor 6 of X, the direction stepping motor 7 of Y, and the coloring unit 12 which carry out revolution actuation of the main shaft 52 may be carried out through the output interface 70.

[0047] In addition, in ROM67, various data required in order to perform the control program which controls the whole operation of the above-mentioned embroidery sewing machine, i.e., the control program which carries out actuation control of each motors 6, 7, 63, 72, 73, and 74, the control program which carries out actuation control of the liquid crystal display 23a, the control program which carries out actuation control of the ink jet head 34 or the air compressor 30 grade, sewing, and coloring operation etc. are stored.

[0048] Next, an operation of the above-mentioned embroidery sewing machine is explained focusing on maintenance processing of the ink jet head 34 by said maintenance equipment 25.

[0049] It explains referring to drawing 1 and drawing 2 first about the maintenance processing performed at the time of activation termination of sewing actuation. In addition, sewing actuation is performed as follows. That is, while a user sets cloth 4 to said embroidery frame, the yarn die 75 of the yarn of a white system is set as a needle thread 18. Moreover, a needle thread 18 is pulled out from said yarn die 75, and it sews via a predetermined thread-guard path, and lets it pass to the hole of a needle 18. And selection of whether for an electric power switch to be turned on and to perform a request selection and coloring sewing of an embroidery pattern (sewing data), cleaning treatment of the ink jet head 34 of the coloring unit 12 mentioned later, etc. are performed suitably. Then, starting and a safety switch 19 are operated.

[0050] Then, while said needle bar 16 moves up and down according to the control program memorized in ROM67 of said control unit 65, said embroidery frame 5 drives, with sewing operation is performed. Moreover, coloring actuation which colors a needle thread 18 is performed. In this case, even if a color substitute is in sewing of an embroidery pattern, since a needle thread 18 is colored automatically, it is not necessary to exchange a needle thread 18. And the non-colored part at the time of a sewing start and the color mixture part at the time of a color substitute are about 1-2 stitches, and can perform the color

substitute with very few errors. In addition, about the detail of this coloring actuation, although indicated by the application for patent 2000-230400 for which these people applied previously, since it separates from the meaning of this invention, that explanation is omitted here.

[0051] Now, after sewing operation is completed, a control unit 65 detects and sews the location of a needle bar 16, and moves a needle 18 to the best location. Next, a pressure bar 11 is raised in the cleaning location which is a location where the coloring section 13 and said maintenance equipment 25 of said coloring unit 12 counter mostly.

[0052] If said pressure bar 11 moves to the predetermined location of mist or a lower part from a cleaning location, the upper part of the front face of said body 38 will contact the rear face of said attraction cap 46. Furthermore, if said body 38 goes up, said attraction cap 46 will resist the energization force, and will rotate in the direction of anti-arrow-head A. Therefore, in this example, said body 38 (front face) functions as an operating member. And if said body 38 arrives at a cleaning location as shown in drawing 2, the rear face of the attraction cap 46 will be stuck to the front face of said body 38, and will block head opening of ink regurgitation nozzle 41a (capping actuation).

[0053] In this case, first, said attraction cap 46 sticks to said body 38, it is in the condition which blocked ink regurgitation nozzle 41a, and an air compressor 30 is driven. Thereby, air foam and the foreign matter which were mixed in the interior of said body 38 are sucked out of regurgitation nozzle 41a with some ink to the attraction cap 46, and are collected by the recovery tank 29 through the ink discharge hole 50 and the recovery tube 28. Next, if the pressure bar 11 in a cleaning location is dropped, the attraction cap 46 will rotate in the direction of arrow-head A according to the energization force of a spring 51, and it will be estranged from a body 38. By driving an air compressor 30 again in this condition, the ink absorbed by the ink absorption member 49 of the attraction cap 46 is collected by the recovery tank 29 through the ink discharge hole 50 and the recovery tube 28.

[0054] If a pressure bar 11 is dropped further, the head of the wiper blade 47 of maintenance equipment 25 will contact the soffit section of the front face of a body 38. At this time, since the wiper blade 47 consists of members which have elasticity, the head of said wiper blade 47 is pressed against the front face of a body 38 by that elastic force. And the point of said wiper blade 47 grinds and moves the front face of said body 38 toward the upper part with the drop of said pressure bar 11 from the lower part (wipe actuation). Consequently, the ink adhering to the front face of said body 38 is removed, and clarification of the ink regurgitation nozzle 41a is carried out.

[0055] Then, a pressure bar 11 is raised again, where the attraction cap 46 is stuck in the front face of a body 38, ink discharging is performed, and injection of ink is made into homogeneity (Flushing actuation).

[0056] Thus, in this example, since the coloring section 13 and maintenance equipment 25 were constituted on another object, said coloring section 13 can be miniaturized and it can install near the sewing needle 17. For this reason, coloring actuation of sewing thread can be performed with a sufficient precision.

[0057] Moreover, since it constituted so that maintenance processing by said maintenance equipment 25 might be performed by making the bearing bar 45 which fixed said maintenance equipment 25 to the sewing-machine machine frame 1 move anchoring and said pressure bar 11 to a cleaning location, or making it move up and down to it, the activity for the maintenance processing as another object of the coloring section 13 and maintenance equipment 25 does not become troublesome.

[0058] And to maintenance equipment 25, maintenance processing was constituted so that the actuation usually performed might be interlocked with and it might perform at the time of activation of sewing actuation called lifting actuation and vertical movement of a pressure bar 11, and termination. For this reason, in order to perform said maintenance processing, it is not necessary to carry out troublesome actuation and, and it is not necessary to prepare the special member for it.

[0059] Furthermore, said maintenance equipment 25 was constituted from attraction cap 46 and a wiper blade 47, and it constituted so that it might have four maintenance functions, "a purge", "wipe", "capping", and "Flushing." For this reason, these four maintenance processings can be performed by single actuation of actuation of a pressure bar 11.

[0060] Furthermore, when a pressure bar 11 was in a downward location, said attraction cap 46 was evacuated from the field in connection with sewing actuation, and when a pressure bar 11 went up, it constituted so that said attraction cap 46 might rotate and maintenance processing might be performed. For this reason, even if it has attached maintenance equipment 25 in the bearing bar 45, it does not become the obstacle of sewing actuation.

[0061] In addition, although the coloring section 13 and maintenance equipment 25 were made to estrange and have been arranged in the above-mentioned example, it is not limited to this, and like the 2nd example shown in drawing 11, the coloring section and maintenance equipment may be made to approach and you may arrange.

[0062] That is, drawing 11 which shows the 2nd example is the vertical section front view showing the coloring section 81 of the coloring unit 12 roughly, and the condition that (a) has a pressure bar 11 in the lowest location, and the condition that (b) has a pressure bar 11 in a cleaning location are shown. The maintenance room 83 is established in the lower part within the body 82 of the coloring section 81. The ink jet head 34 is arranged through the spring 84 by the lower part within said body 82 possible [frequent appearance displacement] from said maintenance room 83.

[0063] In addition, at drawing 11, after the front face of the ink jet head 34 has been exposed, it is shown. Moreover, although it does not appear in drawing 11, in the front part of said maintenance room 83, the attraction cap 46 of said maintenance equipment 25 is arranged in within said body 82.

[0064] On the other hand, the cylindrical member 85 has fixed in the head section of the sewing-machine machine frame 1. When the lower part of said cylindrical member 85 is ****(ed) by the right part within said body 82 and said pressure bar 11 is in the lowest location, the soffit section of said cylindrical member 85 is located above said ink jet head 34. In addition, dip surface part 85a is prepared in the soffit section of said cylindrical member 85.

[0065] If according to the above-mentioned configuration the coloring section 81 will go up in connection with this if a pressure bar 11 goes up, and said pressure bar 11 arrives at a predetermined cleaning location, it will be moved to horizontal left-hand side by said cylindrical member 85, and the ink jet head 34 will be held in the maintenance room 83 by it. Therefore, in this example, said cylindrical member 85 functions as an operating member. Moreover, an ink jet 34 is moved in the direction containing a horizontal component. Consequently, ink regurgitation nozzle 41a is blocked by the attraction cap 46. Moreover, in said pressure bar 11, by repeating a drop and lifting from the best location, the rear face of the front face of the ink jet head 34 and the attraction cap 46 is ground, and ink regurgitation nozzle 41a is cleaned.

[0066] Thus, with the configuration of the 2nd example, since the ink jet head 34 was moved horizontally and the ink jet head 34 is separated from the sewing needle 17 or the needle thread 18, soiling in ink etc. or involving in a sewing needle 17 and a needle thread 18 on the occasion of a maintenance, by the member which operates for a maintenance is prevented. That is, in this 2nd example, the direction corresponding to claim 3 is a direction containing the horizontal component which separates from a sewing needle 17 or a needle thread 18.

[0067] Although it is a technical matter for doing so the effectiveness of "preventing soiling in ink etc. or involving in a sewing needle 17 and a needle thread 18 on the occasion of a maintenance by the member which operates for a maintenance" about this "it separating from a sewing needle 17 or a needle thread 18", at a present stage, it does not indicate to a claim. From now on, if needed, it adds to the present claim or can become the technical matter of invention which relates to division application from this application.

[0068] In addition, the configuration of the 2nd example except having mentioned above is the same as the 1st example. Therefore, also in the 2nd example, the almost same operation as the 1st example and effectiveness can be acquired.

[0069] Moreover, as long as the ink jet head 34, a sewing needle 17, and a needle thread 18 estrange mutually, you may make it move to an entire horizontal direction, although it is made to move to a component including the direction which separates the ink jet head 34 from a sewing needle 17 or a needle thread 18 in the 2nd above-mentioned example. Furthermore, as long as it estranges mutually,

with the orientation of the ink jet head 34, a needle swing may be made to perform towards reverse and both the needle swing actuation and migration of the ink jet head 34 may be performed. Although it does not indicate this "the ink jet head 34, a sewing needle 17, and a needle thread 18 estranging mutually on the occasion of a maintenance" to a claim at a present stage, either, future and if needed, it adds to the present claim or can become the technical matter of invention which relates to division application from this application.

[0070] With the configuration of the 2nd example, although maintenance equipment 25 has been arranged to the front part of the maintenance room 83, you may arrange so that a maintenance can perform maintenance equipment 25 in the location of the ink jet head 34 at the time of lifting of a maintenance.

[0071] In addition, in the coloring section 13 shown in the 1st example of the above, although not illustrated, in order to prevent that the ink which was breathed out from ink regurgitation nozzle 41a, and scattered to the front adheres to cloth 4, a flange may be prepared in the front lower part of a body 38.

[0072] Moreover, it constituted from an above-mentioned example so that migration in a cleaning location and vertical movement of maintenance processing of the pressure bar 11 in the case might be performed automatically, but you may constitute so that a user may carry out manually, or you may constitute so that automatic and manual either may be possible.

[0073] Furthermore, not only the configuration attached in a pressure bar but said maintenance equipment can be attached in the member prepared in other sewing-machine machine frames. Furthermore, the maintenance processing by said maintenance equipment is limited to the configuration performed by vertical movement of a pressure bar being interlocked with, and does not have ** again. For example, by removing a yarn die from *****, by constituting or operating the threader lever for making the threader of a needle thread perform automatically so that [the maintenance processing by said maintenance equipment] it may be performed, you may constitute so that maintenance processing by said maintenance equipment may be performed.

[0074]

[Effect of the Invention] Since this invention was constituted so that maintenance processing of said ink jet head by maintenance equipment might be performed by operating an operating member, it does so the effectiveness that the activity for maintenance processing can be finished easily, in the yarn coloring sewing machine equipped with a yarn coloring means by which the ink made to breathe out from an ink jet head colors sewing thread, so that clearly from the above explanation.

[Translation done.]

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] The side elevation in which showing the 1st example of this invention, and fracturing and showing a part of coloring section in a downward location, and maintenance equipment

[Drawing 2] The side elevation fracturing and showing a part of coloring section in a lifting location, and maintenance equipment

[Drawing 3] III-III in drawing 1 Sectional view which meets a line

[Drawing 4] IV-IV in drawing 1 Sectional view which meets a line

[Drawing 5] The front view of an embroidery sewing machine

[Drawing 6] The perspective view showing the coloring section circumference of embroidery equipment and a coloring unit

[Drawing 7] The plan of embroidery equipment

[Drawing 8] The side elevation of embroidery equipment

[Drawing 9] For (a), the perspective view showing the drive of a needle bar and (b) are the decomposition perspective view of a needle bar connecting bracket.

[Drawing 10] The block diagram showing an electric configuration

[Drawing 11] The vertical section front view of the coloring section in case the vertical section front view (a) of the coloring section in case the 2nd example of this invention is shown and a pressure bar is in the lowest location, and a pressure bar are in a cleaning location (b)

[Description of Notations]

In four, cloth (processing cloth) and 11 among drawing a coloring unit, and 13 and 81 for a pressure bar and 12 The coloring section (yarn coloring means), 17 a needle thread (sewing thread) and 24 for a sewing needle and 18 An ink supply recovery system (yarn coloring means), 25 -- maintenance equipment and 34 -- an ink jet head and 38 -- in a body (operating member) and 41a, a wiper blade and 49 show an ink absorption member, and, as for an ink regurgitation nozzle and 46, 85 shows a cylindrical member (operating member), as for an attraction cap and 47.

[Translation done.]

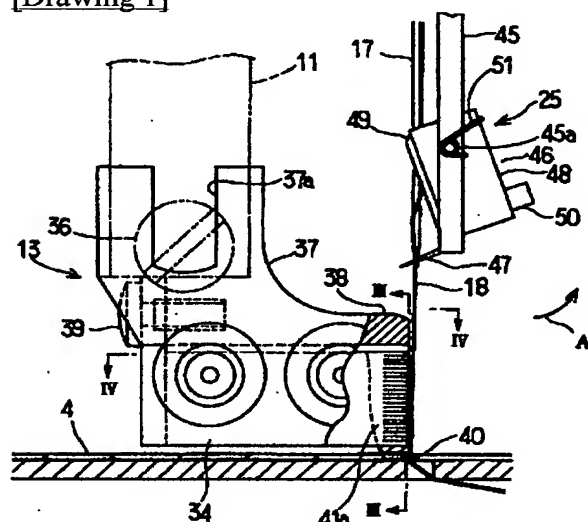
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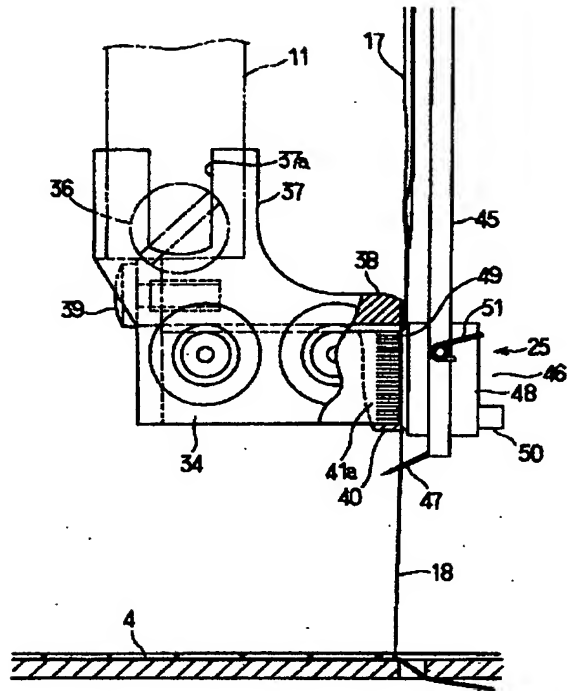
DRAWINGS

[Drawing 1]

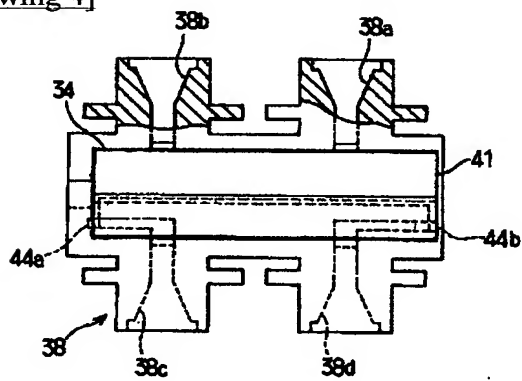


- | | |
|-------------|---------------|
| 4:加工布 | 34:インクジェットヘッド |
| 13:糸着色手段 | 38:操作部材 |
| 17:縫針 | 41a:インク吐出ノズル |
| 18:縫い糸 | 46:吸引キャップ |
| 25:メンテナンス装置 | 47:ワイパーブレード |
| | 49:インク吸引部材 |

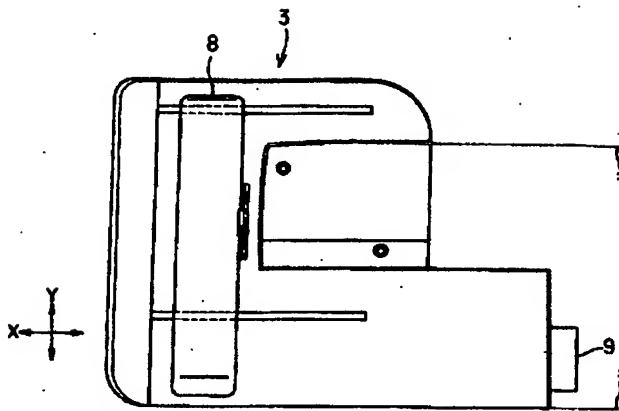
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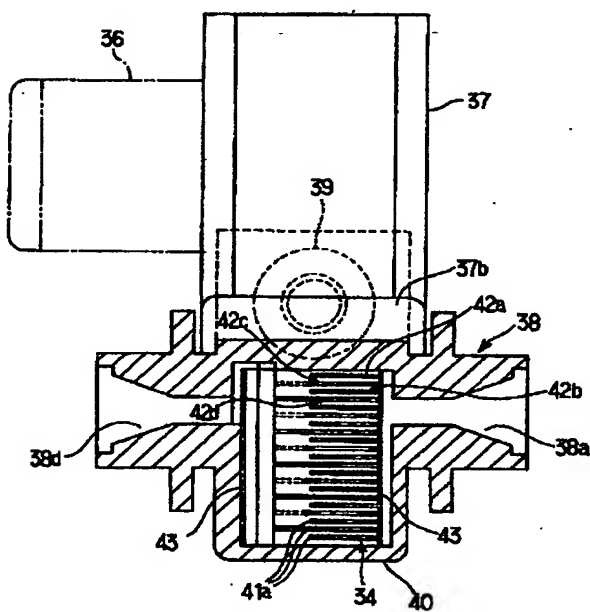
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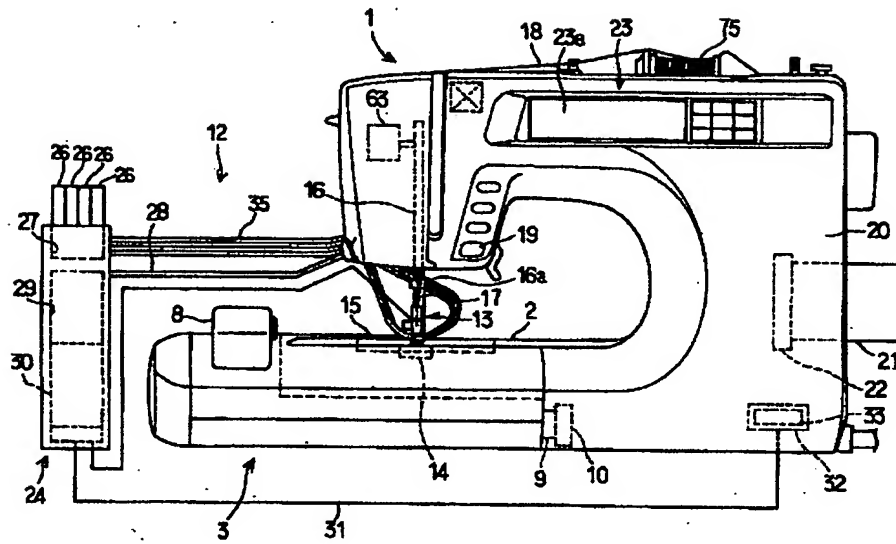
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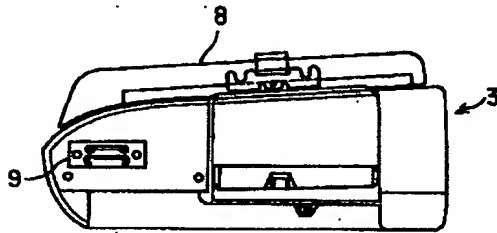
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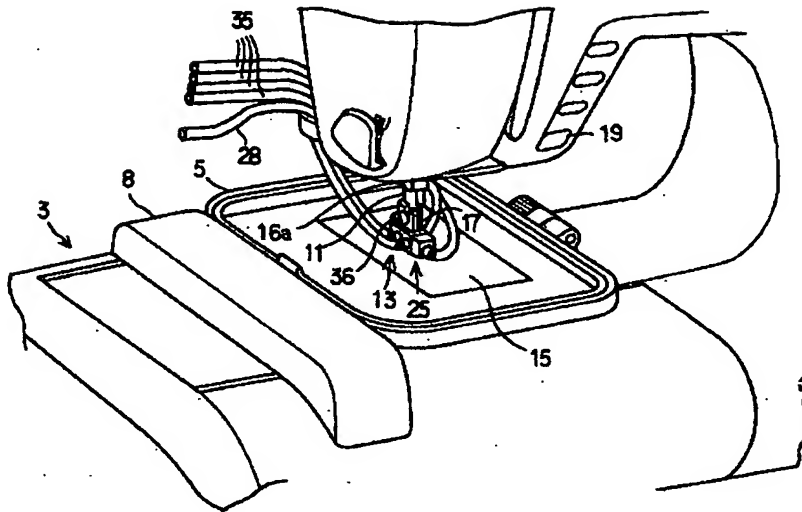
[Drawing 5]



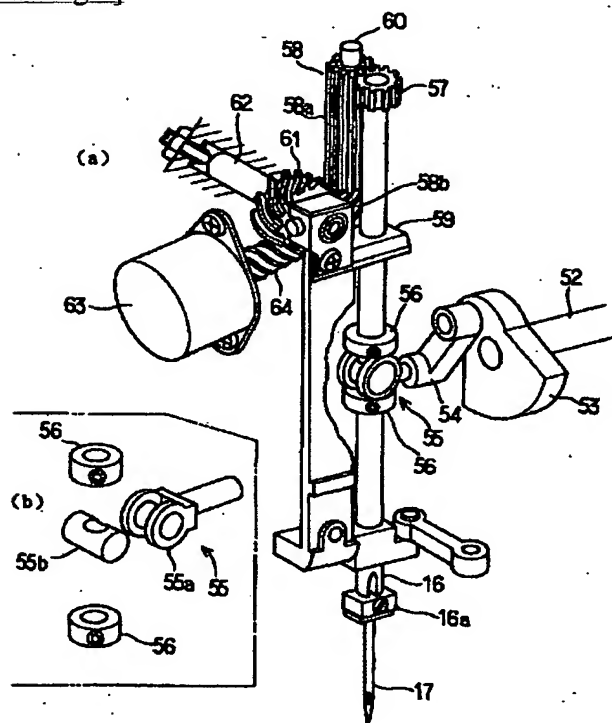
[Drawing 8]



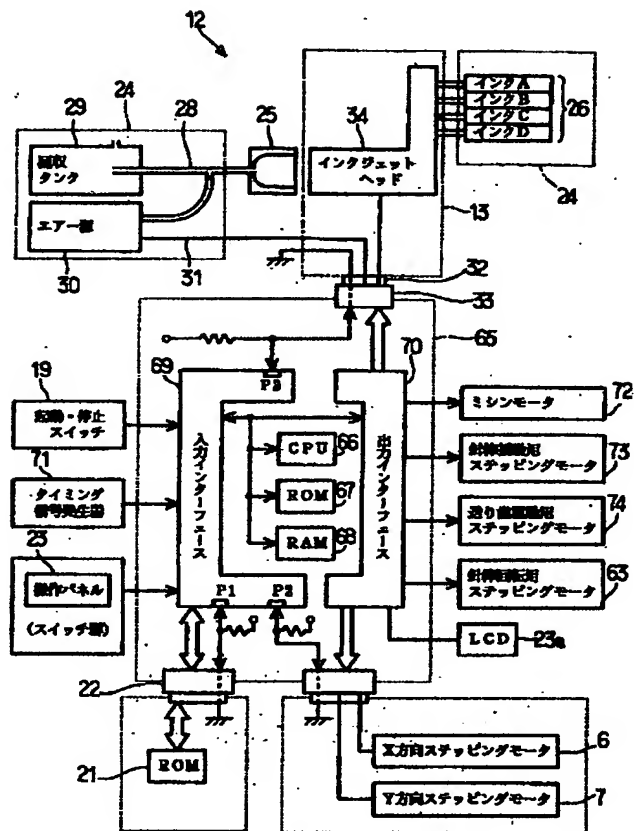
[Drawing 6]



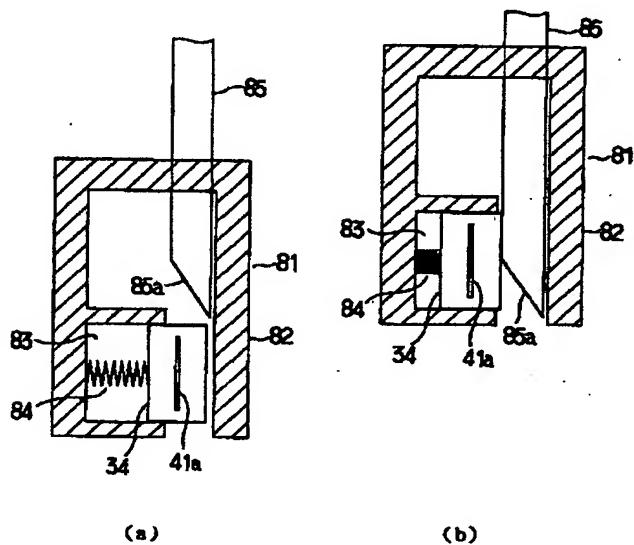
[Drawing 9]



[Drawing 10]



[Drawing 11]



[Translation done.]